**Technology Improvement Plan – Larry A. Spickard, Marvin Ridge High School**

This technology improvement plan may also be found at the following Technology Survival Guide Wiki:

<http://spickardchemistry.wikispaces.com/>

The technology grant should be utilized to implement a broad, integrated platform of hardware and software to facilitate the school distract achieving higher student performance on core standards and reducing total education costs. Total costs consider actual technology resource costs, administrator and teaching costs, administrative costs and supplies costs. The recommendation takes into account a longer term view – recognizing that platforms of hardware and software can’t easily or inexpensively be changed – so we have to take into account longer term needs and trends as we make decisions.

Recommendation for one new hardware acquisition:

An electronic white board should be acquired as the focal point for communicating learning materials and supporting an interactive collaborative environment. An electronic whiteboard becomes the key tool to bridge between the teacher’s computer, internet-based resources and students. Some of the detailed considerations about the electronic whiteboard are as follows:

* Cost – typical new installations with digital camera projection can cost near $2,000. There are markets for used and reconditioned boards that can reduce the cost by up to 50%. The only routine maintenance costs after installation are periodic replacement of projector bulbs.
* The value contributed to the curriculum is potentially significant. Through the teacher’s PC all types of information from internet sites may be projected and presented for group discussion, Instructional videos for example may be presented through presentation from the teachers PC. All presentation materials including PowerPoints, spreadsheets, and word processing documents which the teacher develops for instruction may be presented form the teacher’s PC. While these teaching materials may be presented live during class they also then can be saved and referred to later in the learning management system. The electronic whiteboard also allows for editing of materials with a set of electronic pens or by touch. This enables the tool to be used for discussion among students by small groups allowing for collaboration. The capability to use touch, visual and audio formats allows the teacher to reach different learners who are uniquely responsive to tactile, visual, or musical content.
* Possible drawbacks to the whiteboards are minimal. There are risks that the teachers become stationary during instruction when operating the board. Teachers can enable boards with Bluetooth remote operators to ensure they are mobile in the classroom while operating the board. Training will be required but rather than a drawback this training is within the scope of the teachers and students capabilities.
* Strategies to evaluate the effectiveness of the whiteboards will include user surveys of both teachers and students after a level of proficiency has been demonstrated. The teacher’s proficiency itself will be integrated into peer and administrator reviews of how they are utilizing and integrating the whiteboards into curriculum.

Portable Device Recommendation

A core recommendation is to implement a strategy of one Chromebook for each student. The Chromebook provides several specific advantages:

* Purchase cost per unit is less than a traditional PC or tablet. Data indicates total life cycle costs will also be minimized compared with other portable devices.
* The Chromebook provides a device with broad and flexible access to applications providing the opportunity to impact curriculum with many different applications.
* A drawback of the Chromebook is that it will not support certain programming languages (Java) that are required to run certain learning applications which require more rigorous computing. Applications such as these will need to be run with the collection of shared personal computers available in the school media center.
* The strategy to manage the Chromebooks is to provide a Chromebook for each student. By standardizing on one device we will reduce troubleshooting time and expense, as well as proactive preventive maintenance. Each Chromebook with be permanently marked with a unique and permanent ID tag and signed out to the student at the beginning of the year after they and their parents sign a contract indicating they are responsible for the safe keeping and potential replacement of the Chromebook.
* The strategy to assess the effectiveness of the Chromebooks will be to monitor the following variables:
  + Survey students for satisfaction – how do they rate the experience and functionality of the Chromebook after some period of use?
  + Survey teachers for satisfaction – does the Chromebook support improved strategies for achieving learning objectives.
  + Time required to start the computer
  + Frequency of virus incidents
  + Battery life
  + Reliability – frequency of repairs and maintenance tickets per 1000 hours of use.
* There are potential safety concerns with the use of the Chromebooks in the classroom. The flexibility of the devices makes it possible for students to potentially access inappropriate web sites which are unrelated to school use. Safeguards will need to be established to prevent access to inappropriate sites, teachers will need to implement procedures to monitor computer use in the classroom and the curriculum should be planned for selective Chromebook use for specific valuable learning activities.

Recommendation for cloud-based acquisition:

* Providing access to the Google Cloud (or specifically referred to as the Google Apps for Education) will make the largest number of applications available to students and at the lowest unit total cost per application available. Total unit costs are the cost per application used including all aspects of costs – direct costs to access software, maintenance costs by information technology specialists within the school, productivity impact of the systems on educators, cost impacts due to system downtime, and costs to administer the systems. According to the Google reference at: <https://www.google.com/edu/products/productivity-tools/>, some of the cost highlights of committing to the Google Education Cloud Platform are as follows:
  + - No direct cost to access for educational institutions
    - 90% less labor to support
    - 52 hours per year of improved teacher productivity
    - 99.9% uptime
* With the integrated strategy of using Chromebooks and the Google Cloud for Education, there is a large suite of both Google-based applications and non-Google application freeware to support the most of the tools needed to achieve learning objectives.
  + Within the Google Education Suite, there are several applications to support educators and students. Some of the key products available as freeware are:
    - * Google classroom
      * Email system – Gmail
      * On-line calendar system
      * Google Docs for word processing
      * Spreadsheet tools
      * Presentation software tools
      * Google timer – an excellent classroom management tool
  + In addition there are many other non-Google applications which could be important to educators. The Google platform is very broad and flexible to support a broad scope of these additional tools. The following are some examples of both commercial and freeware software products consistent with the implementation of the Google Cloud platform and Chromebooks:
    - A commercial website, icurio, (<https://icurio.com>) offer digital learning library with over 360,000 open educational resources which are aligned with core standards and validated by expert educators.
    - Another commercial website, schoolnet (http://www.pearsonschool.com/index.cfm?locator=PS2pWa&PMDbProgramID=106341) provides data-driven education software intended to align assessment, curriculum and instruction.
    - Study Island, ([www.studyisland.com](http://www.studyisland.com) ) is a commercial website which provides instructional materials targeted to specific state subject standards with aligned formative assessment tools and corrective methodologies.
    - There are several freeware technology tools consistent with the Google Cloud platform for formative assessments available:
      * Kahoot (<https://getkahoot.com>) is a class interactive game environment which provides flexibility for teacher or student creativity and assessment with potential collaboration between students in groups.
      * Socrative (<https://socrative.com>) also allows for creative development of formative assessment tools in a group environment with real-time feedback.
      * Within the Google platform there are additional free formative assessment tools such as coupling Google forms with Flubaroo to perform real-time assessment and feedback with analysis with students.
    - Within our State of North Carolina there are several freeware resources and sites compatible with the Googe Cloud platform:
      * NCDPI WikiCentral page (<http://ncdpi.wikispces.net/>) provides general subject resources from the department of public instruction along with course updates.
      * Learn NC (<http://learnnc.org/>) is a program of the UNC School of Education which provides insights on the most innovative and successful K-12 school practices.
      * Metametrics (<http://metametricsinc.com/>) develops scientific measures of academic achievement and complimentary technology assessment with real-world instruction materials.
      * NC WiseOwl (<http://www.wiseowl.org/>) provides students with a resource collection of on-line resources for use in research projects and homework assignments.
    - In summary there are many sources of commercial software and educational freeware which are supported by and integrated with the recommendation of implementing the Google Cloud Educational platform.
  + The broad scope of tools and flexible applications associated with the Google Cloud platform contributes value to the curriculum in several areas:
    - It provides a broad and deep set of resource materials available to the student.
    - There are many tools for executing formative assessments which are real-time, effective and fun for the students to engage.
    - There is capability to enhance collaboration in the classroom with these tools .
    - There are also significant opportunities for enrichment and differentiated instruction with these tools to meet the needs of individual students.
  + The most significant drawback is the decision to commit to a specific platform increases the risk that the direction of the choice is incorrect or becomes obsolete. This risk is minimized in this case because the Google Cloud platform appears to be very well resourced and evidence of consistent innovation and growth. It is not clear that just one technology will dominate in the long term (example, Apple, Microsoft, or Google) and as along as the platform of choice appears to be competitive, successful, and planning for future innovation it is not a bad choice. The alternative of not making a selection among platforms is not acceptable as one misses out on the benefits and incurs extra costs. The Google platform for education appears to contribute both great value and competitive costs compared with other platform choices available.
  + The strategy to assess the effectiveness of the Google Cloud platform is closely aligned with the assessment strategy of the Chromebooks in the previous section since they are integrated tools. So the steps of assessment are similar but with a slightly different focus on the software and the impacts of the software involving the following steps:
    - Survey students for satisfaction – how do they rate the experience and functionality of the Google Cloud and related software after some period of extended use.
    - Survey teachers for satisfaction similarly – do the Cloud tools support learning objectives, are they effective and efficient.
    - Frequency of problems – lack of availability, any incidents of viruses.

* + Potential safety concerns are also similar. There are additional concerns from the ones mentioned in the previous section to ensure all copyright, registrations, and other proprietary licenses with using the software are always understood and respected. The user must always research and validate the original and open rights to use specific material with free and open software sites.

Recommendation for a technology workshop

* The recommendations here all involve change for people with the work of how we interact with and use different technology tools. It is recommended to plan for a technology workshop for administrators and teachers to train people on the specific skills of how to use the new tools but also to address the human side of change – to help people understand why we are moving forward with new technology tools, what is the impact of the changes for them, what is the value or benefits of the change and to provide them with a future vision of how we see our technology plans for the future. There are specific elements we will need to address:
  + The cost of the workshop will need to cover the paid time for the people involved and their expenses. The workshop must not come at a cost burden to the people we are asking to adapt to change and lead change for others.
  + We need to communicate what we expect for the cost of the program – how moving forward with the Chromebooks and Google Cloud platform will help make their lives easier, improve their productivity to do other things, and how in the long run this is the lowest total cost technology alternative.
  + A part of the agenda will include a specific value proposition focused on the curriculum. Specifically we will spell out curriculum benefits as follows:
    - * Benefits from additional access to learning resources at low cost.
      * Enhanced formative assessment tools with improved feedback.
      * Curriculum which more effectively engages students.
      * Better assessment and analysis tools of student performance.
      * More capability to differentiate curriculum based on student needs, including enrichment alternatives.
  + The workshop should provide a daily survey to get feedback on effectiveness and suggestion for improvement. The feedback should be summarized real time and reviewed with the group for group discussion, validation and builds to create a specific action plan for improving future seminars.

Plan for sharing best practice technology use

* To drive implementation of the tools recommended here there should be two key elements of a plan to communicate best practices proactively:
  + A Wiki should be created by specific content and topics where teachers can contribute their experiences with best practices by updating content on this wikispace.
  + Teacher should be incented to contribute to this proactively. There are expectations communicated with them about doing this but there should also be tangible rewards such as dinner for two for teacher who contribute above a certain level.
  + The technology workshop should be repeated on an annual basis. At future workshops after a period of implementation has been completed, teachers should be expected to come and make presentations about their success stories with the use of the tools. Sometimes it is easier to get contributors to be proactive if we refer to these as a success stories in a personal way versus making some claim about a best practice. The presentations should be facilitated and discussion should be held around the presentation to stimulate additional ideas.
  + A person should be designated as the owner of targeted areas where best practices are desired. There can be ad hoc best practices but in some specific areas the leaders need to articulate where best practices are more important to be in place linked with the critical success factors of the organization. These best practices are a higher priority and an owner who is accountable for developing the outcomes needs to be identified with metrics and benchmarks supporting the logic for the best practices being tracked.
  + Best practices need to be visible and a point of accountability for the leaders of the department/school/organization including goals and rewards. These should be communicated to external stakeholders – parents, students and community resource providers.

Electronic resource sharing venue for staff to share resources

* Here again wikispace should be organized to bring together information for sharing of resources between educators. The information should be organized by subject and topic with someone providing overall oversight on the structure and strategy for how it is done – with some accountability and ownership for the results.

School schedule for computer maintenance and back-up procedures

* The professionals in the IT department in consultation with vendors should develop recommended best practices for maintenance of the Chromebooks. This should include proactive and preventive procedures for both students and teachers, typically an annual inspection and preventive maintenance procedure.
* Since we are moving to a Cloud environment there is a benefit in that more of our data is constantly being backed-up in the Cloud format and with a higher degree of reliability, up-time and virus protection than we could achieve with a stand-alone PC environment. If individual files are being maintained at the computer drive level in addition to this they should be backed up at least quarterly depending on the importance of the data involved.

In summary, there are several areas where we can effectively apply the grant to acquire new capabilities and achieve higher standards. With the ability to leverage the whiteboard technology, move to a Chromebook/Google Cloud platform, and improve the processes for how we communicate about best practices we will significantly increase the utilization of technology in the classroom and put the students in a better position to meet and exceed core standards.